

Patent Claims

1. Positioning apparatus for transferring at least one electronic component (6, 6a), in particular a chip, from a first flat support (1) to at least one predetermined location (2a) on a second flat support (2) which extends parallel to the first support, comprising an ejection device (7, 8) for removing the component (6a) from the first support (1) by means of an ejection movement, characterized by a camera device (10) for detecting position data of the predetermined location (2a), of the component (6a) to be removed from the first support (1) and optionally of the ejection device (7, 8), which together with the camera device (10) are arranged essentially on an imaginary common straight line (11).
2. Positioning apparatus according to Claim 1, characterized in that the first support (1) is connected to a first and the second support (2) is connected to a second positioning device (5; 3, 4) for positioning them with respect to the common straight line (11).
3. Positioning apparatus according to Claim 2, characterized in that a displacement of the first and second flat support (1, 2) in the support planes thereof can be carried out by means of the first and second positioning device (5; 3, 4) respectively.
4. Positioning apparatus according to Claim 2 or 3, characterized in that a rotation of the first and/or second support (1, 2) about a rotation axis perpendicular to the support planes thereof can be carried out by means of the first and/or second positioning device (5; 3, 4).
5. Positioning apparatus according to any of the preceding claims, characterized in that the ejection device (7, 8) is connected to a third positioning device for positioning it with respect to the common straight

line (11) by means of a displacement carried out parallel to the support planes.

6. Positioning apparatus according to any of the preceding claims, characterized in that the first flat support (1) is designed as a wafer and the second flat support (2) is designed as a strip-shaped substrate.

7. Positioning apparatus according to Claim 6, characterized in that the strip-shaped substrate consists of an optically transparent material.

8. Positioning apparatus according to Claim 6, characterized in that the strip-shaped substrate consists of a partially perforated material.

9. Positioning apparatus according to any of Claims 6 to 8, characterized in that further components (13, 14, 15) which were applied prior to the transfer of the electronic component (6a) are arranged on the strip-shaped substrate.

10. Positioning apparatus according to any of Claims 6 to 9, characterized in that bond contacts (12) for bonding the component (6a) to the substrate are arranged at the predetermined location (2a) on the strip-shaped substrate.

11. Positioning apparatus according to any of the preceding claims, characterized in that the second support (2) comprises individual substrate elements which are spaced apart from one another.

12. Positioning apparatus according to any of the preceding claims, characterized in that the camera device (10) is arranged below the second support (2) and the common straight line (11) extends through the camera device (10) in the vertical direction.

13. Positioning apparatus according to any of the preceding claims, characterized in that a flat support element (9) for supporting part of the second support (2) made of optically transparent material is arranged between the camera device (10) and the second support (2).

14. Positioning apparatus according to Claim 13, characterized in that the support element (9) can be displaced along the straight line (11) in the vertical direction and can preferably be heated.

15. Positioning apparatus according to any of the preceding claims, characterized in that the camera device (10) comprises an evaluation device for evaluating and comparing the detected position data.

16. Positioning apparatus according to Claim 15, characterized by a control device for controlling the positioning devices (5; 3, 4) as a function of the compared position data.

17. Positioning method for transferring at least one electronic component (6, 6a), in particular a chip, from a first flat support (1) to at least one predetermined location (2a) on a second flat support (2) which extends parallel to the first support, comprising an ejection device (7, 8) for removing the component (6a) from the first support (1) by means of an ejection movement, characterized by the following steps:

- displacing the second flat support (2) along its support plane below the first flat support (1);
- detecting position data of the electronic component (6a) arranged on the first support (1) by means of a camera device (10) arranged below the second support (2) consisting of a material which is optically

transparent at least in some regions, during displacement of the second support (2);

- positioning a predetermined location (2a) on the second support (2) above the camera device (10);
- detecting position data of the predetermined location (2a) by means of the camera device (10); and
- aligning the first support (1), optionally the ejection device (7, 8) and/or the second support (2) by means of positioning devices (5; 3, 4) connected thereto, by displacement and/or rotation thereof with respect to one another within the support planes, such that the camera device (10), the predetermined location (2a) on the second support (2), the electronic component (6a) arranged on the first support (1) and the ejection device (7, 8) lie on an imaginary common straight line (11).

18. Method according to Claim 17, characterized in that the second support (2) which is designed as a strip-shaped substrate is moved in its support plane at a displacement speed which is calculated from the distance between the electronic components (6, 6a) to be removed successively from the first support (1), a displacement speed of the first support (1) and position data of an optically transparent region (16) of the second support (2), through which the camera device (10) detects position data during displacement of the second support (2).